PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 200313702 WO	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2005/051260	International filing date *(day/month/year)* 17.03.2005	Priority date *(day/month/year)* 20.03.2004
International Patent Classification (IPC) or national classification and IPC G02F1/1335, G02F1/1343, G02F1/13357		
Applicant HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 10 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *sent to the applicant and to the International Bureau)* a total of sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☒	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
22.09.2005	25.01.2006
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Stang, I Telephone No. +31 70 340-3493

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/051260

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages	
1-19	as originally filed
Claims, Numbers	
1-32	received on 22.09.2005 with letter of 19.09.2005
Drawings, Sheets	
1/30-30/30	as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees, the applicant has:
   - ☐ restricted the claims.
   - ☐ paid additional fees.
   - ☐ paid additional fees under protest.
   - ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with.

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos. .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-32
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-32
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-32
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document/s/:

D1: EP-A-0 296 429 (INTERNATIONAL BUSINESS MACHINES CORPORATION) 28 December 1988 (1988-12-28)

D2: US-A-6 127 199 (INOUE ET AL) 3 October 2000 (2000-10-03)

D3: EP-A-1 003 354 (SEIKO EPSON CORPORATION; MINNESOTA MINING AND MANUFACTURING COMPANY) 24 May 2000 (2000-05-24)

1.1 The document D2 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):
A method of applying to a display substrate colour elements and addressing busbars in a defined alignment relative to each other, the method comprising the steps of:
(a) forming a series of translucent dielectric structures (figure 18, (1600),(1000)) on a planar surface of a carrier (3000), each structure comprising a colour element-receiving surface region ((1702) in figure 19);
(b) forming said busbars (1400b, D1 in figure 20) by an electrically conductive material;
(c) depositing a colour element material on each of said colour element-receiving surface regions to form a series of colour elements (1770);
(d) affixing said colour elements to a translucent display substrate (figure 5,(180)) by means of a translucent adhesive material (160); and
(e) removing said carrier (figure 5,(100)).

1.1.1 The subject-matter of claim 1 differs from this known method in that
- the translucent dielectric structures comprise raised levees;
- adjacent dielectric structures being spaced apart to define a trench there between;
- busbars are formed by at least partially filling each of said trenches with electrically conductive material.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

1.2 The problem to be solved by the present invention may be regarded as:
In conventional display cells the patterning of colour filters and busbars formed

on the same (transfer-)substrate at certain positions requires in general multiple lithographic steps which make the display production expensive (description, page 1, lines 21-28).

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
Since trenches (which define the position of busbars) are formed in said dielectric structures simultaneously with levees (which define the position of colour elements) both busbars and colour elements are automatically self-aligned and the position of the busbars with respect to the colour filters can be chosen as desired.

1.3 Claims 2-15 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

2.1 The document D2 is regarded as being the closest prior art to the subject-matter of claim 16, and shows (the references in parentheses applying to this document):
A method of applying to a display substrate light filters and addressing busbars in a defined alignment relative to each other, the method comprising:
forming said light filters (1770) and said busbars (1400b) on a conductive surface ((3100), column 10, lines 23-26)) of a transfer carrier (3000);
adhering said light filters and said busbars to said display substrate; and
removing said transfer carrier (column 18, lines 54-57; figures 19).

2.1.1 The subject-matter of claim 16 differs from this known method in that said busbars are in electrical contact with said conductive surface.
The subject-matter of claim 16 is therefore new (Article 33(2) PCT).

2.2 The objective problem to be solved by the present invention may be regarded as:
Conductive material used as busbars in alignment with light filters has to be provided at low cost (no vacuum deposition) and low temperatures (compatible to organic filter/other structures).
The solution to this problem proposed in claim 16 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
Using the conductive surface as an electrode during electroplating (description, page 10,

lines 18-27) the spaces defined by light filters (or other structures) can easily and accurately filled with conductive material (metals) at low temperatures. No special dielectric structures or expansive deposition techniques are necessary.

3. Claim 17 differs from claim 1 only in that the colour elements of claim 1 are now specified as light filters. This does not change the reasoning with respect to claim 1. Accordingly, the subject-matter of claim 17 is both new and does involve an inventive step (Articles 33(2) and 33(3) PCT).

4. Claim 18 contains all the technical features of claim 1 (or of claim 17, respectively) by only specifying some of these features more closely. Accordingly, the reasoning under point 1 is applicable to claim 18 and therefore the subject-matter of claim 17 is both new and does involve an inventive step (Articles 33(2) and 33(3) PCT).

5.1 The document D3 is regarded as being the closest prior art to the subject-matter of claim 19, and shows (the references in parentheses applying to this document):
A method of applying to a display substrate emissive colour elements, the method comprising:
forming said emissive colour elements on a surface of a transfer carrier (paragraph [0041]);
adhering said emissive colour elements to said display substrate (paragraphs [0056],[0057]); and
removing said transfer carrier (paragraph [0061]).

5.1.1 The subject-matter of claim 19 differs from this known method in that also busbars are formed on the surface of the transfer layer.
The subject-matter of claim 19 is therefore new (Article 33(2) PCT).

5.2 The objective problem to be solved by the present invention may be regarded as:
The transparent electrodes of D3 might have a rather large resistivity which could spoil the display quality by gradient effects.
The solution to this problem proposed in claim 19 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
Emissive colour elements and addressing busbars, which obviously have to be aligned

with respect to the emissive colour elements, a formed together on a common transfer substrate.

5.3 Claims 20-23 are dependent on claim 19 and as such also meet the requirements of the PCT with respect to novelty and inventive step (obviously, claim 20 is meant to be dependent on claim 19).

6.1 The document D2 is regarded as being the closest prior art to the subject-matter of claim 24, and shows (the references in parentheses applying to this document):
A method of applying to a display substrate emissive colour elements, the method comprising:
A method of applying to a display substrate colour elements and addressing busbars in a defined alignment relative to each other, the method comprising:
forming said colour elements (1770) and said busbars (1400b) on a surface of a transfer carrier (3000).
adhering said colour elements and said busbars to said display substrate; and
removing said transfer carrier (column 18, lines 54-57; figures 19);

6.1.1 The subject-matter of claim 24 differs from this known method in that said colour elements at least partially absorb ultraviolet light and are spaced apart from each other by regions that are substantially transmissive of UV light.
The subject-matter of claim 24 is therefore new (Article 33(2) PCT).

6.2 The objective problem to be solved by the present invention may be regarded as:
In the framework of a transfer method transparent electrode tracks should be exactly aligned with respect to the colour elements.
The solution to this problem proposed in claim 24 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
Ultraviolet light is allowed to pass the space between the colour elements which are at least partially uv-absorbing. By using a photoresist which is applied to a transparent conductor layer it is possible to pattern exactly the electrode tracks according to the shape of the colour elements.

6.3 Claims 25,26 are dependent on claim 24 and as such also meet the requirements of

the PCT with respect to novelty and inventive step.

7.1 Claim 27 is different from claim 16 only in that the "light filters" of claim 16 are now replaced by the more general term "colour elements". As in claim 16 the subject-matter of claim 27 differs from the known method of D2 in that said busbars are in electrical contact with said conductive surface.
The subject-matter of claim 27 is therefore new (Article 33(2) PCT).

7.2 In the same way as for claim 16 (see section 2.2) it is concluded that claim 27 comprises an inventive step (Article 33(3) PCT).

7.3 Claim 28 is dependent on claim 27 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

8.1 The document D2 is regarded as being the closest prior art to the subject-matter of claim 29, and shows (the references in parentheses applying to this document):
A transfer carrier (3000) comprising a substrate having a conductive surface ((3100), column 10, lines 23-26)) on which is releasably mounted (column 18, lines 54-57; figures 19) a plurality of colour elements (1770) and a plurality of busbars (1400b) in a defined alignment relative to each other.

8.1.1 The subject-matter of claim 29 differs from this known method in that said busbars are in electrical contact with said conductive surface.
The subject-matter of claim 29 is therefore new (Article 33(2) PCT).

8.2 The objective problem to be solved by the present invention may be regarded as:
Conductive material used as busbars in alignment with light filters has to be provided at low cost (no vacuum deposition) and low temperatures (compatible to organic filter/dielectric structures).
The solution to this problem proposed in claim 29 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
Using the conductive surface as an electrode during electroplating the spaces defined by light filters or other structures can easily and accurately filled with conductive material (metals) at low temperatures. No special dielectric structures are necessary.

8.3 Claims 30-32 are dependent on claim 29 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item IV

Lack of unity of invention

1. The International Preliminary Examination Authority considers that there are 4 inventions covered by the claims indicated as follows:

1) Claims 1-15, 17, 18 directed to dielectric structures with raised levees and trenches filled with conductive material;
2) Claims 16, 27-32 directed to busbars being in electric contact with conductive surface of the transfer carrier;
3) Claims 19-23 directed to emissive displays having busbars formed on transfer carrier;
4) Claims 24-26 directed to at least partially uv-absorptive colour elements.

2. The reason for which the present application has been deemed to contain 4 inventions which are not linked such that they form a single general inventive concept, as required by Rules 13.1, 13.2 and 13.3, PCT are as follows:

Invention 1:
From comparison of the disclosure of D2 and the technical features of claims 1,17,18 features are derived which make a contribution over the prior art (special technical features (STF)): see section 1.1.1, 3 and 4. Based on these STF an objective problem to be solved by the 1st invention can be construed which is given in section 1.2.

Invention 2:
From comparison of the disclosure of D2 and the technical features of claims 16,27,29 features are derived which make a contribution over the prior art (special technical features (STF)): see section 2.1.1, 7 and 8.1.1. Based on these STF an objective problem to be solved by the 1st invention can be construed which is given in section 2.2.

Invention 3:
From comparison of the disclosure of D3 and the technical features of claim 19 features

are derived which make a contribution over the prior art (special technical features (STF)): see section 5.1.1. Based on these STF an objective problem to be solved by the 1st invention can be construed which is given in section 5.2.

Invention 4:
From comparison of the disclosure of D2 and the technical features of claim 24 features are derived which make a contribution over the prior art (special technical features (STF)): see section 6.1.1. Based on these STF an objective problem to be solved by the 1st invention can be construed which is given in section 6.2.

The above analysis shows that the special technical features of inventions 1 to 4 are neither the same nor corresponding (i.e. solve different problems) to each other.

3. Also, one finds for each invention the following technical effects:
1st invention: In the production of displays using a transfer carrier method the precise alignment of colour elements and respective busbar in desired positional relationship can be achieved;
2nd invention: In the production of displays using a transfer carrier method a cheap deposition of conductive material at low temperatures becomes possible.
3rd invention: In emissive displays produced by a transfer carrier method gradient effects due to the resistance of transparent electrodes can be reduced by busbars.
4th invention: In the production of displays using a transfer carrier method transparent electrodes can be formed which are in exact alignment with colour elements.
This appears to show lack of corresponding technical effects as well.

4. Consequently neither the objective problems underlying the subjects of the four claimed inventions, nor their solutions defined by the (special) technical features allow for a relationship to be established between said inventions, which involves a single general inventive concept.
In conclusion, therefore, the 4 groups of claims are not linked by common or corresponding special technical features and define 4 different inventions not linked by a single general inventive concept. The application, hence does not meet the requirements of Unity of Invention as defined in Rules 13.1 and 13.2 PCT.